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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,923	06/08/2001	Eckard Deichsel	21137.PUS	2515

7590 12/18/2002

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EXAMINER

MENEFEE, JAMES A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/877,923

Examiner

James A. Menefee

Applicant(s)

DEICHSEL ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-23 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

Response to Amendment

In response to the amendment filed 23 September 2002, claims 22-23 are added and claims 1, 5-9, 11-14, 17, 19 and 21 are amended. Claims 1-23 are pending.

Claim Objections

Claim 13 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim must refer to other claims in the alternative only. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 11, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Knox (previously cited US 5,627,854). Knox discloses the claimed invention as follows (see Figs. 1-2 and discussion thereof, strains are discussed in col. 4):

Regarding claim 1, Knox discloses a saturable reflector for a laser at a lasing wavelength where a reflector 12,13 is applied onto a surface of a substrate 14 and a layer sequence with a saturable absorbing effect is applied onto the reflector 12,13. The layer sequence contains a single quantum well 11 that is inherently strained due to the materials used, said quantum well 11 is adjacent to a cap layer (to the right of 11 in Fig. 2) of uniform composition. It is inherent

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that the materials of the quantum well, the layer thickness, and the strain all serve to define an absorbing effect within a wavelength range that includes the lasing wavelength. It is disclosed that the degree of the saturable effect is defined by the selection of the distance between the quantum well and the surface of the cap layer. It is inherent that the device is adjacent to a surrounding gaseous medium.

Regarding claim 2, the lattice strain of the quantum well will occur with the cap layer adjacent to a side of the quantum well.

Regarding claims 3-4, it can be seen that there is a low strain intermediate layer (to the left of 11 in Fig. 2) adjacent the reflector and the quantum well 11 is surrounded by this intermediate layer and the cap layer, the intermediate layer and cap layer being the same material.

Regarding claims 5 and 22, numerous materials are disclosed as usable in the device, and it is inherent that in certain cases the strain will be as claimed.

Regarding claim 6, the reflector is a Bragg reflector that consists of first and second materials having different refractive indexes, the cap and intermediate layers being made of one of these materials.

Regarding claim 11, the method of forming a device is not germane to the patentability of the device itself, and therefore the method of growing the quantum well is not given patentable weight.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Cunningham et al. (previously cited US 5,701,327).

Knox discloses in col. 4 that the layers of the reflector may be GaAs and AlAs, or III-V semiconductors such as InGaAs and AlAs, and it is disclosed that the optical thickness of these layers is $\lambda/4$ (col. 2). This leads to the physical thicknesses as claimed (optical thickness = (physical thickness) x (refractive index)). It is not disclosed that the quantum well should be made of the materials as claimed. Cunningham shows that these materials for use as a quantum well in a saturable reflector are known in the art (par. bridging col. 5-6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the quantum wells out of this material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416. It is inherent that these materials will have the effect as claimed.

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox. Knox discloses the limitations of the claims as shown above, but does not disclose the following:

Regarding claim 9, it is not disclosed that the reflector be a highly reflecting metal mirror. Metal mirrors are well known in the art, and such a metal mirror that is highly reflecting will perform the same as the Bragg reflector of Knox. Therefore, it would have been an obvious art known substitution to substitute the highly reflective mirror for the mirror of Knox.

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Regarding claim 12, it is not disclosed that the cap, insulating layer, and quantum well have a combined thickness of $\lambda/2$. However, it was disclosed that the quantum well might be located in various places so that the saturation intensity may be varied. Should the quantum well be located in between the two light and dark layers at the right edge of Fig. 2, then these light and dark layers and the quantum well will have a length of $\lambda/2$.

Claims 10, 14-21, and 23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Alcock et al. (US 5,901,162). Knox discloses the claimed invention as shown above, but does not teach that the substrate may be transparent to the laser light, or that there may be an AR coating on the end of the device opposing the reflector. Alcock teaches a saturable reflector of similar design having a substrate 1 that is transparent to the lasing wavelength, and an AR coating on the output side of the device opposing the reflector. It would have been obvious to one skilled in the art to include a transparent substrate because this configuration allows for the advantages caused by growing layers non-epitaxially, as taught by Alcock. It would have been obvious to one skilled in the art to include an AR coating because this will minimize reflection loss, as taught by Alcock.

Response to Arguments

Applicant's arguments filed 23 September 2002 have been fully considered but they are not persuasive.

Applicant argues that a cap layer of uniform composition is not disclosed by Knox. This limitation is shown in the rejection of claim 1 above.

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Applicant argues that one skilled in the art would not control the saturable effect by selection of the distance between the quantum well and the boundary surface of the cap. However, it is clear from Knox that one may vary the location of the quantum well within the cap layer. This accomplishes the claimed limitation.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
December 3, 2002


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